Jared F. Miller

Convex Optimization · Nonlinear Systems · Control

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Education

Northeastern University

Boston, MA, USA

Ph.D. in Electrical and Computer Engineering — *Sept. 2018 - Present*

- Communications, Control, and Signal Processing (CCSP)
- Advised by Prof. Mario Sznaier
- Thesis Committee: Mario Sznaier, Octavia Camps, Bahram Shafai, Eduardo Sontag, Didier Henrion (LAAS-CNRS)
- GPA: 4.0 (4.0 Scale)
- Expected Graduation May 2023

M.S. in Electrical and Computer Engineering — *Sept. 2015 - May 2018*

- Communications, Control, and Signal Processing (CCSP)
- GPA: 3.852 (4.0 Scale)

B.S. in Electrical Engineering — *Sept. 2013 - May 2018*

- Minor in Mathematics
- GPA: 3.865 (4.0 Scale), summa cum laude

Research Publications

Journal Papers (published)

1. Jared Miller and Mario Sznaier. Data-Driven Gain Scheduling Control of Linear Parameter-Varying Systems using Quadratic Matrix Inequalities. *IEEE Control Systems Letters*, 2022. [link] (Early Access)
2. Jared Miller, Yang Zheng, Mario Sznaier, and Antonis Papachristodoulou. Decomposed structured subsets for semidefinite and sum-of-squares optimization. *Automatica*, 137:110–125, 2022. [link]
3. J. Miller, D. Henrion, and M. Sznaier. Peak Estimation Recovery and Safety Analysis. *IEEE Control Systems Letters*, 5(6):1982–1987, 2021. [link]
4. Jared Miller, Muhammad Ali Al-Radhawi, and Eduardo Daniel Sontag. Mediating Ribosomal Competition by Splitting Pools. *IEEE Control Systems Letters*, 5(5):1555–1560, 2021. [link]

Journal Papers (conditionally accepted)

1. Jared Miller and Mario Sznaier. Bounding the Distance to Unsafe Sets with Convex Optimization, 2021. [link] (Conditionally Accepted by IEEE Transactions on Automatic Control in 2022)

Conference Proceedings (published)

1. Jared Miller and Mario Sznaier. Facial Input Decompositions for Robust Peak Estimation under Polyhedral Uncertainty. *IFAC-PapersOnLine*, 55(25):55–60, 2022. [link] (Young Author Award)
2. Jared Miller, Didier Henrion, Mario Sznaier, and Milan Korda. Peak Estimation for Uncertain and Switched Systems. In *2021 60th IEEE Conference on Decision and Control (CDC)*, pages 3222–3228, 2021. [link] (Outstanding Student Paper Award)
3. J. Miller, R. Singh, and M. Sznaier. MIMO System Identification by Randomized Active-Set Methods. In *2020 59th IEEE Conference on Decision and Control (CDC)*, pages 2246–2251, 2020. [link]
4. Jared Miller, Yang Zheng, Mario Sznaier, and Antonis Papachristodoulou. Decomposed Structured Subsets for Semidefinite Optimization. In *2020 21st IFAC World Congress*, 2020. [link]
5. Chieh Wu, Jared Miller, Yale Chang, Mario Sznaier, and Jennifer Dy. Solving Interpretable Kernel Dimensionality Reduction. In H. Wallach, H. Larochelle, A. Beygelzimer, F. d'Alché-Buc, E. Fox, and R. Garnett, editors, *Advances in Neural Information Processing Systems*, volume 32, pages 7915–7925. Curran Associates, Inc., 2019. [link] (acceptance rate 21.9%)
6. J. Miller, Y. Zheng, B. Roig-Solvas, M. Sznaier, and A. Papachristodoulou. Chordal Decomposition in Rank Minimized Semidefinite Programs with Applications to Subspace Clustering. In *2019 IEEE 58th Conference on Decision and Control (CDC)*, pages 4916–4921, 2019. [link]
7. J. Miller and B. Shafai. A Model of Heave Dynamics for Bagged Air Cushioned Vehicles. In *2019 IEEE Conference on Control Technology and Applications (CCTA)*, pages 976–981, 2019. [link]
8. B. Taskazan, J. Miller, U. Inyang-Udoh, O. Camps, and M. Sznaier. Domain Adaptation Based Fault Detection in Label Imbalanced Cyberphysical Systems. In *2019 IEEE Conference on Control Technology and Applications (CCTA)*, pages 142–147, 2019. [link]

Conference Proceedings (accepted but not yet published)

1. Jared Miller and Mario Sznaier. Bounding the Distance of Closest Approach to Unsafe Sets with Occupation Measures. In *2022 61st IEEE Conference on Decision and Control (CDC)*, 2022 (61st IEEE Conference on Decision and Control [CDC] Dec. 6-9, 2022)
2. Jared Miller, Tianyu Dai, and Mario Sznaier. Data-Driven Superstabilizing Control of Error-in-Variables Discrete-Time Linear Systems, 2022 (61st IEEE Conference on Decision and Control [CDC] Dec. 6-9, 2022)
3. Filip Bečanović, Jared Miller, Vincent Bonnet, Kosta Jovanović, and Samer Mohammed. Assessing the Quality of a Set of Basis Functions for Inverse Optimal Control via Projection onto Global Minimizers, 2022 (61st IEEE Conference on Decision and Control [CDC] Dec. 6-9, 2022)

Conference Proceedings (submitted)

1. Jared Miller and Mario Sznaier. Data-Driven Gain Scheduling Control of Linear Parameter-Varying Systems using Quadratic Matrix Inequalities. *IEEE Control Systems Letters*, 2022. [link] (Early Access)
2. Jared Miller, Tianyu Dai, and Mario Sznaier. Superstabilizing Control of Discrete-Time ARX Models under Error in Variables, 2022. [link]
3. Alexander Epstein, Nimish Magre, and Jared Miller. Time-Frequency Regularized Overlapping Group Shrinkage, 2022

Preprints

1. Jared Miller, Tianyu Dai, and Mario Sznaier. Data-Driven Stabilizing and Robust Control of Discrete-Time Linear Systems with Error in Variables, 2022. [link]
2. Jared Miller and Mario Sznaier. Facial Input Decompositions for Robust Peak and Reachable Set Estimation under Polyhedral Uncertainty, 2021. [link]

Seminars

1. Bounding the Distance to Unsafe Sets with Convex Optimization, DCSD Rising Stars, 2nd Modeling, Estimation and Control Conference, Jersey City, October 2-5 2022. [link]
2. Tutorials about Convexity, Interior Point Methods, Frank-Wolfe algorithms (with applications to system identification), and Polynomial Optimization, June 27, 2022, From Data to Control, Israeli Association of Automatic Control (with M. Sznaier). [link]
3. "Bounding distances to unsafe sets", June 16, 2022, IfA Coffee Talks, ETH Zurich. [link]
4. "Bounding distances to unsafe sets", June 14, 2022, LA3 Meeting, EPFL Lausanne. [link]
5. "Bounding distances to unsafe sets", June 3, 2022, Journées SMAI MODE, University of Limoges (XLIM). [link]
6. Tutorials about Interior Point Methods, Polynomial Optimization, Frank-Wolfe algorithms and variations, and SDP approximations, May 16-20, Sparsity and Big Data in Control, Systems Identification, and Machine Learning, European Embedded Control Institute.
7. "Bounding distances to unsafe sets", April 14, 2022, Conic Linear Optimization for Computer-Assisted Proofs, Mathematisches Forschungsinstitut Oberwolfach (MFO). [link]
8. "Bounding distances to unsafe sets", June 28, 2021, Brainstorming days on measure and polynomial optimization (BrainPOP), LAAS-CNRS. [link]
9. "Data-Driven Peak and Reachability Set Estimation", May 25, 2021, MS112 Methods of Learning Dynamical Systems for Control, SIAM Conference on Dynamical Systems. [link]
10. "Analysis and Control of Time-Delay Systems with Occupation Measures", May 3, 2021, BrainPOP, LAAS-CNRS. Work not yet published, in preparation. [link]
11. "Exploiting Structure in Rank-Constrained and Approximated Semidefinite Programs", December 19, 2019, TISEM Operations Research Seminar, Tilburg University. [link]

Poster Sessions (without Conference Proceedings)

1. "Safety Analysis using Distance Estimation and Measures." August 24, 2022. CLEVR-AI MURI Yearly Review Meeting, Northeastern University. [link]
2. "Exploiting SDP Structure Yields Tighter Approximations." April 9, 2020. RISE, Northeastern University (remote). [link]
3. "Exploiting SDP Structure Yields Tighter Approximations." February 24, 2020. IPAM Control, Learning and Optimization workshop, University of California, Los Angeles. [link]
4. "Chordal Decompositions in Rank Minimized SDPs." May 30-31, 2019. Learning for Decision and Control (L4DC), Massachusetts Institute of Technology. [link]
5. "Chordal Decompositions in Rank Minimized SDPs." May 10, 2019. New England Machine Learning Day, Northeastern University. [link]
6. "Scattered data interpolation through B-spline wavelets and the Elastic Net." April 14, 2017. RISE, Northeastern University. [link]
7. "A parallelized Python-based Multi-Point Thomson Scattering analysis in NSTX-U." October 29, 2014. 56th Annual APS Plasma Physics Conference, New Orleans. [link]

Experience

Northeastern University — *Boston, MA, USA*

Research Assistant, Robust Systems Lab, Controls Group — *Jul. 2017 - Present*

Laboratory for Analysis and Architecture of Systems (LAAS-CNRS) — *Toulouse, FR*

Chateaubriand Fellow, Decision and Optimization, Methods and Algorithms in Control (MAC) Team — *Jan. 2022 - Jul. 2022*

Paradigm Hyperloop — *Boston, MA, USA*
Control Theorist, Levitation Group — *Jul. 2017 - Dec. 2017*

ASML Holding — *Veldhoven, NL*
Co-op, Metrology Group — *Mar. 2016 - Aug. 2016*

Advanced Micro Devices (AMD) — *Boxborough, MA, USA*
Co-op, Shader Compiler Group — *Jan. 2015 - Jun. 2015*

Princeton Plasma Physics Laboratory (PPPL) — *Plainsboro Township, NJ, USA*
Intern/Part-time Contractor, Data Visualization Group — *Sep. 2012 - Feb. 2016*

Cornell High Energy Synchrotron Source (CHESS) — *Ithaca, NY, USA*
Summer Intern/Research Assistant — *Jul. 2012 - Aug. 2012*

Teaching

Northeastern University — *Boston, MA, USA*
Teaching Assistant — *Fall 2022*
- EECE 5644: Machine Learning and Pattern Recognition

Teaching Assistant — *Fall 2021*
- EECE 7345: Big Data, Sparsity, and Control

European Embedded Control Institute — *Toulouse, FR*
Teaching Assistant — *May 16-20, 2022*
- Sparsity and Big Data in Control, Systems Identification and Machine Learning

Honors & Awards

Dec. 2022	**Outstanding Student Paper Award**, 2022 61st IEEE Conference on Decision and Control	*Cancún, MX*
Dec. 2022	**Travel Award**, 2022 61st IEEE Conference on Decision and Control	*Cancún, MX*
Oct. 2022	**ASME DSCD Rising Star Award**, MECC 2022 (IFAC)	*Jersey City, NJ, USA*
Sep. 2022	**Young Author Award**, ROCOND 2022 (IFAC)	*Kyoto, JP (remote)*
Apr. 2022	**Travel Award**, MFO: Conic Linear Optimization for Computer-Assisted Proofs	*Oberwolfach, DE*
Jan. 2022	**Travel Award (for Toulouse)**, AFOSR FY22 International Student Exchange Program (ISEP)	*Arvada, CO, USA*
Dec. 2021	**Outstanding Student Paper Award**, 2021 60th Conference on Decision and Control	*Austin, TX, USA*
Apr. 2020	**Chateaubriand Fellowship**, Office of Science and Technology, Embassy of France in the USA	*Toulouse, FR*
Feb. 2020	**Hosting**, IPAM: Intersections between Control, Learning and Optimization (UCLA Workshop)	*LA, CA, USA*
Dec. 2019	**Travel Award for Seminar**, TISEM Seminar at Tilburg University	*Tilburg, NL*
Aug. 2019	**Travel Award**, 2019 IEEE Conference on Control Technology and Applications (CCTA)	*Hong Kong*
2013-2018	**Honors Program**, Northeastern University	*Boston, MA, USA*
2015-2018	**Dean's List**, Northeastern University	*Boston, MA, USA*

Skills

Programming Matlab (incl. Simulink), Python, Mathematica, LaTeX, Julia, C/C++
MS Office Word, Excel, PowerPoint, Publisher

Professional Organizations

Institute of Electrical and Electronics Engineers (IEEE)
(Graduate) Student Member — *Sept. 2013 - Present*

IEEE Eta Kappa Nu (HKN)

Member *Sept. 2014 - Present*

Society for Industrial and Applied Mathematics

Member *Oct. 2019 - Present*

IEEE CSS Technical Committee on Robust and Complex Systems (TC-RoCS)

Member *Sept. 2022 - Present*

IFAC Technical Committee 2.5 Robust Control

Member *Sept. 2022 - Present*

Professional Service

Reviewer

Automatica, IEEE TAC, IEEE L-CSS, L4DC, ROCOND, CDC, Nonlinear Analysis: Hybrid Systems, Kybernetika